

The Characteristics of Patients with Incompatible Crossmatch Test Results in Indonesian Red Cross of Sidoarjo

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ABSTRACT

This study discussed the characteristics of patients with the incompatible crossmatch results in 2017-2021 at Indonesian Red Cross of Sidoarjo. This study was conducted due to the differences, and no study has been conducted regarding the characteristics of adult blood transfusion patients with incompatibility at Indonesian Red Cross of Sidoarjo. The type of study was quantitative descriptive. The sampling technique was the total sampling technique. The data collection technique was documentation through reports from Indonesian Red Cross of Sidoarjo. The results of the study showed that the results of the incompatible crossmatch test were 76 patients with various kinds of incompatible, mainly in the major incompatible of 58 patients (76.40%). The gender most experienced incompatible was female, with 54 patients (71%). Patients who carried out the crossmatch test were mainly 36-45 years old, with 47 patients (62%). The incompatible blood request required blood component PRC 76 (100%). The cause of the most incompatibility case was anemia, with 49 patients (64.46%).

ARTICLE DETAILS

Published On:
30 June 2023

Available on:
<https://ijmscr.org/>

INTRODUCTION

In providing blood transfusion service, health workers or practitioners use standards for blood transfusion service as a reference. Standards for blood transfusion services aim to ensure adequate, safe, and high-quality blood. A crossmatch test, also known as pre-transfusion testing, is a series of tests to ensure that patients' and donors' blood are compatible. The donor's blood and the patient's blood are considered compatible if they match, while the donor's blood and the patient's blood are considered incompatible if they do not match.

Anemia, accidents causing massive blood loss, postpartum hemorrhage, operations, autoimmune hemolytic anemia (AIHA), and thalassemia require transfusion as the treatment (Anita et al., 2017). According to Nancy and Sumanti (2016), blood transfusion recipients often experience adverse reactions such as hemolytic anemia, fever, the transmission of blood diseases, allergic reactions, and the spread of cancer. Patients' bodies react to donor blood transfused to them during transfusion. This ensures blood transfusions are carried out according to clear and appropriate instructions to maximize the benefits over potential risks.

Indonesians have different needs for blood components. Every country must have a bloodstock of at least 2% of the population. Based on Iriani (2019), if a hospital cannot meet

the blood needs, it will result in a fatal incident causing death. As a result, every region must have a sufficient stock of blood.

According to the preliminary survey conducted in 2017 by the researcher at Indonesian Red Cross of Sidoarjo, there were 17 cases of the incompatible crossmatch test. For the crossmatch test, there were 28 crossmatch tests in 2013. In 2014, there were 21 cases of the incompatible crossmatch test. In 2015, there were 22 cases of the incompatible crossmatch test. In 2016, there were 17 cases of the incompatible crossmatch test. There was a difference from 2019 to 2021, according to the incompatible crossmatch test. Because of this difference and because no study regarding the characteristics of adult blood transfusion patients with incompatibilities at Indonesian Red Cross of Sidoarjo has been conducted, the researcher would like to find out the characteristics of patients with incompatible crossmatch test results in Indonesian Red Cross of Sidoarjo.

METHODS

This study was conducted in October-November 2022 in Indonesian Red Cross of Sidoarjo, Jl. Raya Jati No. 1, Babatan, Jati, Sidoarjo, East Java, Indonesia. This study was conducted by collecting report data from 2017 to 2022. The design of the study was quantitative descriptive. Patients from

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2017 to 2021 Indonesian Red Cross of Sidoarjo who had the incompatible crossmatch test became the subject of this study as many as 76 patients. The data collection technique was documentation using secondary data from Indonesian Red Cross of Sidoarjo.

There were three main procedures in this research as follow

1. Research preparation by getting research permit from Department of Pharmacy and Food Analysis, Poltekkes Kemenkes Malang and submitting it to Red Cross of Sidoarjo
2. Research conduction by taking data from incompatible report books.

3. Research evaluation by performing data analysis and classification according to the type of incompatible crossmatch, donors' age, gender, blood type, blood components requested, and patient diagnosis.

RESULTS

Data from the crossmatch results (Figure 1) shows that the highest result is in the major incompatible of 58 patients (76.7%), major-auto control incompatible of 15 patients (19.73%), and major-minor-auto control incompatible of 3 patients (3.94%).

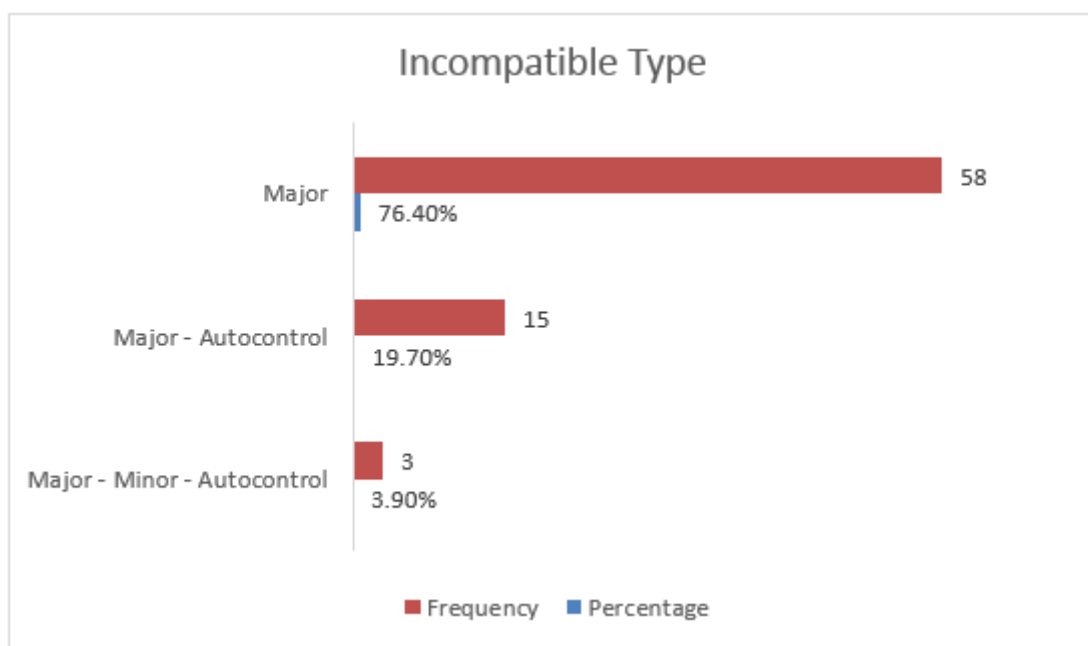


Figure 1. Distribution of Incompatible Patients According to the Type in 2017 - 2021

Figure 2 shows that most patients are female (71%) meanwhile the male presentation is only 29%.

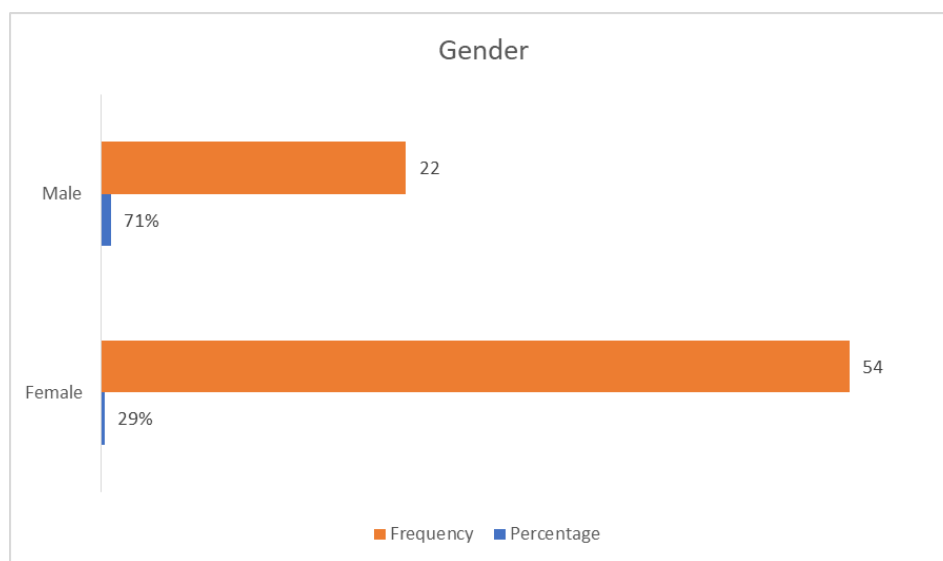


Figure 2. Distribution of Incompatible Patients According to the Gender in 2017 – 2021

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The most incompatible cases in 2017-2021 (Figure 3) was happened to people of 36-45 years old (62%), and the least was 26-35 years old of 29 patients (38%).

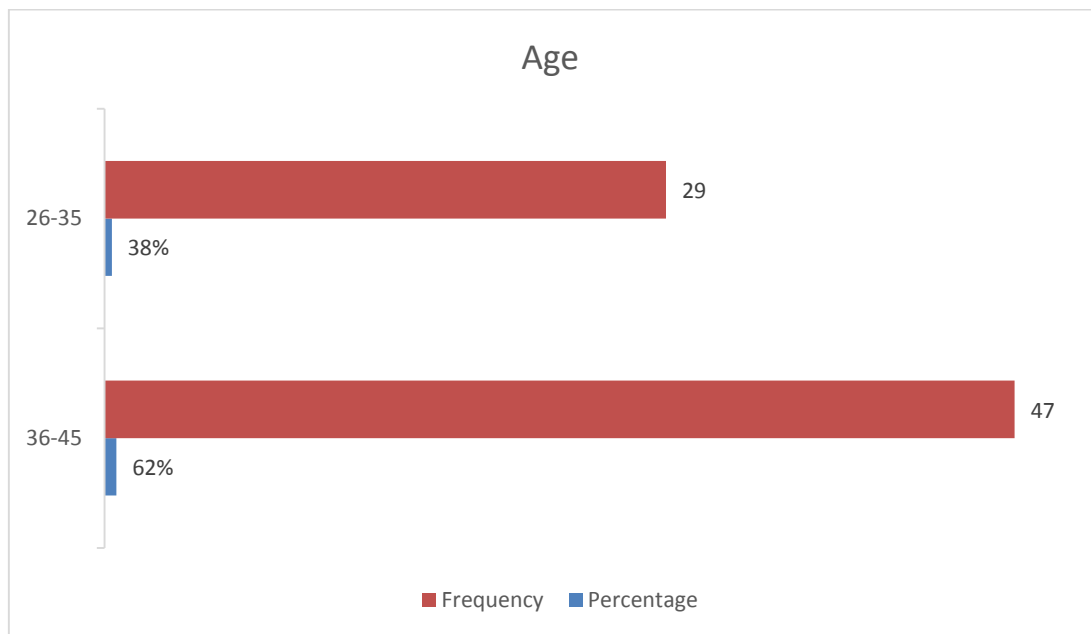


Figure 3. Distribution of Incompatible Patients According to the Age in 2017 – 2021

According to Figure 4, the blood type with the most requested was blood type O rhesus positive of 28 patients (49%).

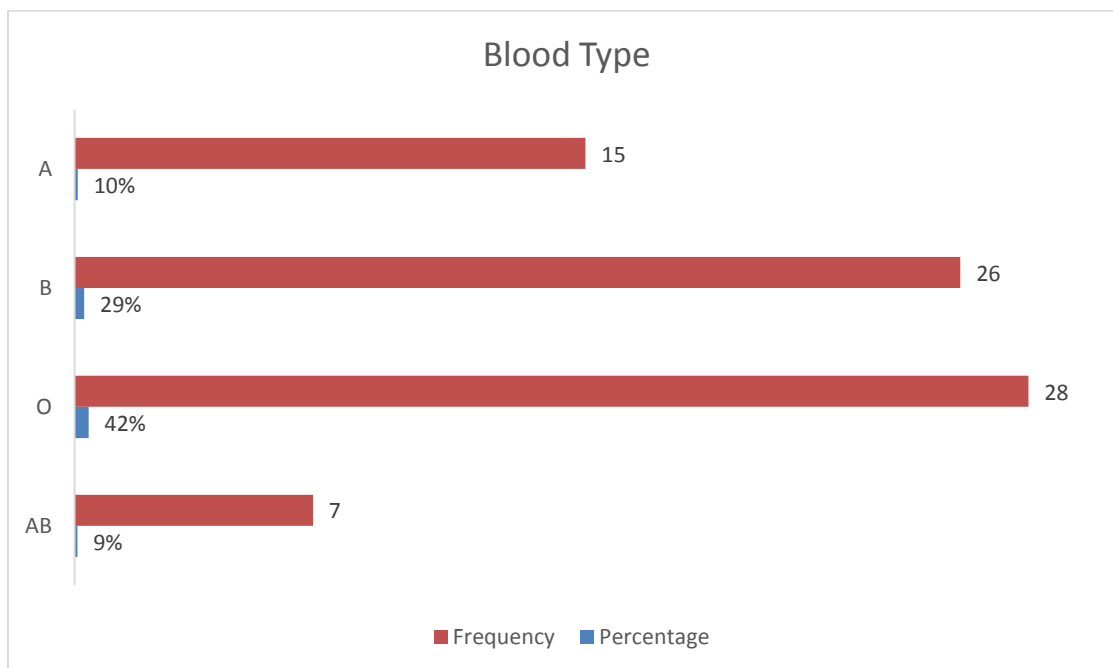


Figure 4. Distribution of Incompatible Patients According to the Blood Type in 2017 – 2021

Figure 5 shows that the most requested blood component which has incompatible crossmatch test results is Packed Red Cell (PRC) of 76 patients (100%).

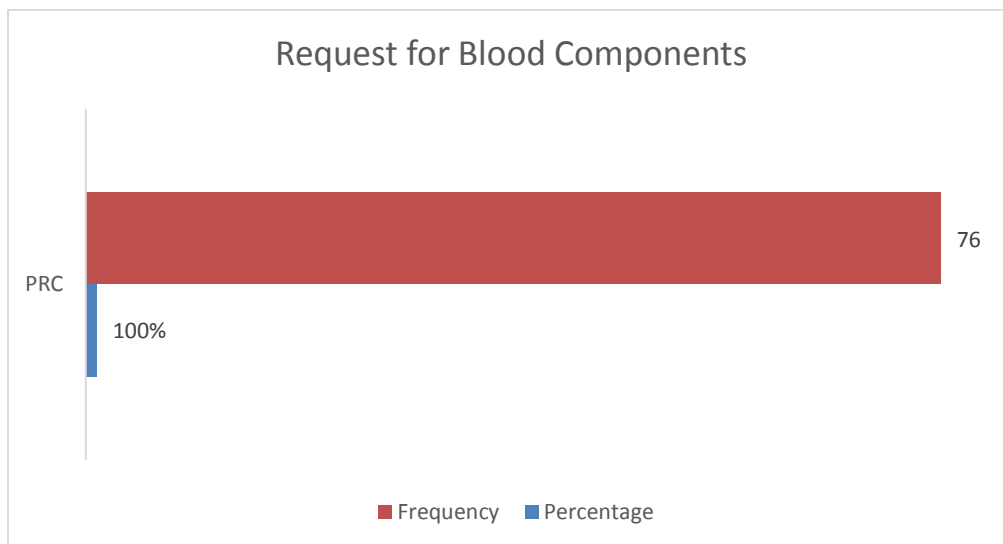


Figure 5. Distribution of Incompatible Patients According to the Request for Blood Components in 2017 – 2021

Figure 6 shows the patients' diagnosis and the highest number was because anemia (64.46%).

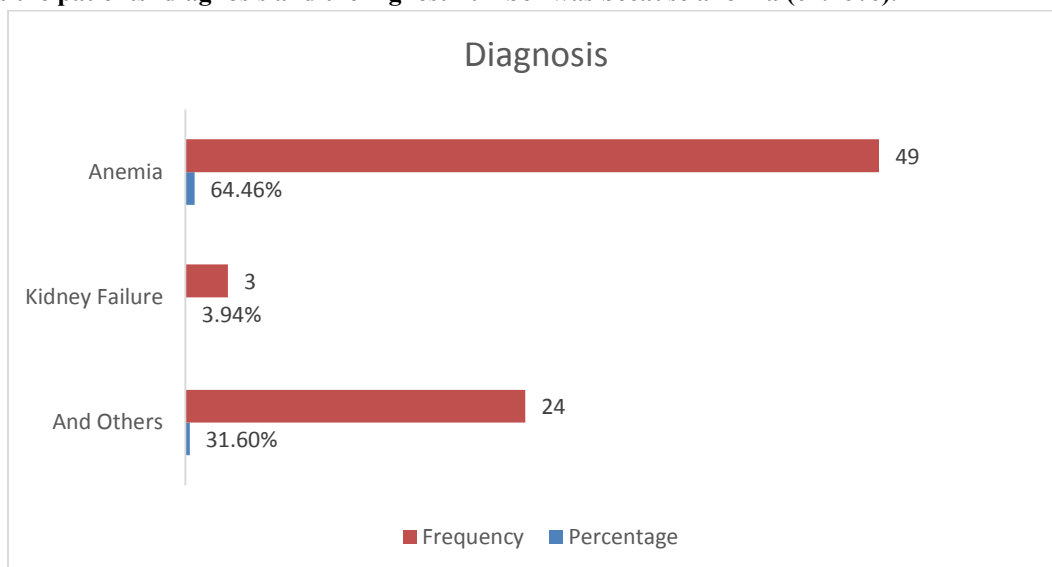


Figure 6. Distribution of Incompatible Patients According to the Diagnosis in 2017 - 2021

DISCUSSION

The highest number of incompatibles in the major is because patients requested blood components in the form of PRC. Major incompatibilities can be caused by the wrong blood type between patients or donors and alloantibodies in the patient's serum. In the case of major incompatibility, further examination was carried out by re-checking the blood types of donors and patients, changing donor blood, carrying out major, minor, and auto-control crossmatches, and carrying out patients' DTC. If the results were positive, the Indonesian Red Cross of Sidoarjo issued a referral letter to the Indonesian Red Cross of Surabaya, and then the following results were submitted to the Indonesian Red Cross of Surabaya:

According to Figure 1, the examination in major-auto control was carried out because patients requested the Whole Blood component. If it was incompatible, it could be concluded that the patients had problems, including multi-transfusion, medicine, and abnormalities of the patient's

serum. The next treatments were checking patients' transfusion histories, screening and identifying patients, checking patients' and donors' blood types, and conducting patients' DCT. However, patients with major autonomic disorders who cannot produce Whole Blood will be administered PRC components according to the approval of the doctor in charge. If the patients were incompatible with major-auto control, the Indonesian Red Cross of Sidoarjo could also process them with a complete examination, major-minor-auto control.

Based on Figure 1, from the major-minor-auto control examination, it can be concluded that donors' and patients' blood had problems with autoantibodies. The next step was to check the blood types of donors and patients. DCT patients, screening antibodies, and identifying patients were conducted. Data from the crossmatch results showed fewer incompatible results because the Indonesian Red Cross of Sidoarjo only carried out major examinations and screening

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antibodies on donors. Antibody identification in patients' blood has not been carried out.

Most patients in this study were female. This result is in accordance with Bhattacharya et al. (2016) in IH Laboratory, Medical College Kolkata Blood Bank, which showed that the most incompatible results were female and caused by anemia.

The highest number of incompatible results came from people in the age range of 36–45 years old. This is because the human body has a limited ability to absorb iron content from food. Based on the study by Erizka et al. (2015), adults mostly diagnosed with anemia were female because an imbalance of nutritional intakes, such as iron, can cause anemia. The hemoglobin level of women is naturally lower than that of men. Women also need more iron intake than men, considering the menstruation process. Women in productive age, starting from adolescence, often experience anemia due to their monthly menstrual cycle and a lack of iron intake. Meanwhile, pregnant women experience anemia because the iron intake is insufficient to meet the needs of pregnant women and the fetus. Women during the postpartum period can also experience anemia due to bleeding from the delivery process.

The most requested blood type is blood type O (Rh+). This is in accordance with the study by Anita et al. (2015), which stated that the most common blood type is blood type O. Blood type O does not have antigens A and B. However, if the DCT examination is positive, it indicates antibodies covering the patients' antibodies.

Pack red cells become the most requested blood component. According to Fuadda et al. (2016), blood in the form of a Packed Red Cell is more common than Whole Blood due to the small amount of plasma content in a Packed Red Cell, which can reduce transfusion reactions in patients.

The distribution of incompatible patients according to the diagnosis is mostly due to anemia. A study by Utami and Mahmudah (2019) stated that anemia is often called blood deficiency due to red blood cells below normal. Anemia can be caused by wrong, irregular, and imbalanced nutritional intake with the adequate nutrients required by the body, which are protein intake, carbohydrate intake, fat intake, vitamin C intake, and especially a lack of iron intake. The impacts of anemia are abortion, giving birth to babies with low weight, having difficulty in delivery because the uterus cannot contract properly, and the risk of postpartum hemorrhage (Rahayu et al., 2019). Thus, to overcome this situation, patients must maintain their health by implementing healthy lifestyle routines, such as eating nutritious food, exercising regularly, drinking water regularly, and so on.

CONCLUSIONS

Based on the study in October-November 2022 regarding the patients' incompatible result at Indonesian Red Cross of Sidoarjo in 2017-2021, it can be concluded into several conclusions as follows:

1. Based on the results of the study, the incompatible crossmatch test result was 76 patients.
2. Based on various kinds of incompatible, the most incompatible was major incompatibility of 58 patients (76.40%).
3. Based on gender, the most incompatible was female of 54 patients (71%).
4. Based on patients' age, the most incompatible crossmatch was 36-45 years old of 47 patients (62%).
5. Based on blood requests, those who are incompatible require blood component PRC was 76 patients (100%).
6. The cause of the most incompatible case was anemia with 49 patients (64.46%)

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